

DEPARTMENT OF Natural Resources  
New York State College of Agriculture and Life Sciences  
CORNELL UNIVERSITY

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PROGRESS REPORT

Evaluation of Skylab Imagery as an Information Service for  
Land Use and Natural Resources, (Skylab) NASA Contract: NAS9-13364.

This report covers the period from December 1 - 31, 1974. During this period, efforts have continued in three major areas: user survey, completion of techniques phase and interpretation tests. The user survey is well underway. Phase I - making all contacts and initial interviews - is completed and Phase II is progressing well. The second phase includes a questionnaire form and an indepth interview on how different users make use of resource information and how they acquire their data. A third and final phase is now being planned. This will include a workshop session held at the Resource Information Lab. All the people participating in the survey will be invited to attend the workshop. The workshop will concentrate on demonstrating remote sensing capabilities and using techniques to extract various kinds of information. Additional time will be spent in seminars on resource information needs and various problem areas. It is expected that this workshop will be held sometime in April.

A method has been developed to determine the best black and white film-developer-time combination to maximize the color enhancement of diazo film composites. Recent diazo film tests have indicated that GAF (yellow, cyan and magenta) diazo film has a log exposure range approximately equal to 1.00. Therefore, the black and white film original would produce the full range of color diazo film densities if the original has a density range of approximately 1.00.

The procedure is to produce a "good" photographic print on any Kodak contrast paper which gives both "shadow" and "highlight" detail. Then locate the

N75-15100  
Unclas 00106  
CSCL 08F G3/43  
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contrast paper number on Table I (attached) and read across to determine the contrast index of the film necessary for a density range of 1.00. Use this contrast index number on the subsequent graphs (Figures 1 and 2) to determine the correct development time for a particular Kodak developer. For example, a print requiring a number 3 contrast grade paper will need a contrast index of 1.18, which can be produced on Blue Sensitive Masking Film in D-11 for a 6 minute development time.

Interpretation tests are now in progress to try to determine the kinds of land use categories which are interpretable from Skylab data. An area 5 x 20 kilometer just north of Kingston, New York has been selected as an area to do intensive interpretation tests. Air photo coverage (scale of 1:24,000) exists for 1968 and 1972. In order to minimize the problems of comparing various land use category interpretations from the New York State Inventory (LUNR) to the multispectral categories, a new set of category definitions has been constructed. Every effort has been made to eliminate ownership and economic use characteristics from the category definition while maintaining recognizable and useful categories for land use management. A two-level land classification has resulted (Table II). Emphasis is placed on spectral components of each category and the intensity of the reflected light (i.e., whether tones are light or dark). A total of 6 Level I categories and 21 Level II categories have been defined. The test site is being interpreted using the 1972 air photos and the categories defined in Table II. Data take off will be at the hectare level. Data take off from Skylab interpretation and the 1968 LUNR data will be compared to this 1972 coverage, also at the hectare level. The 1968 data may also be re-interpreted on the basis of spectral components. Mapping for this area will be done at 1:24,000 scale.

Principal Investigator:

Dr. Ernest E. Hardy

Agency:

NYS College of Agriculture & Life Sciences  
Cornell University  
Ithaca, New York 14853

TABLE I

| KODAK GLOSSY<br>POLYCONTRAST<br>PAPER WITH<br>PC FILTERS | KODAK GLOSSY<br>CONTRAST<br>GRADE PAPERS | LOG EXPOSURE<br>RANGE* | CONTRAST INDEX NEEDED TO<br>PRODUCE A FILM WITH A<br>DENSITY RANGE OF 1.0<br>( .3 to 1.3 ) |
|--|--|------------------------|--|
|  | 0  | 1.50                   | .67  |
| PC 1   | 1  | 1.25                   | .80  |
| PC 1½  |  | 1.15                   | .87  |
| PC 2   | 2  | 1.05                   | .95  |
| PC 2½  |  | .95                    | 1.09   |
| PC 3   | 3  | .85                    | 1.18   |
| PC 3½  |  | .75                    | 1.33   |
| PC 4   | 4  | .70                    | 1.43   |
|  | 5  | .55                    | 1.82   |

\* A normal contrast print results when the density range of the original is approximately equal to the log exposure range of the paper.

BLUE SENSITIVE MASKING FILM  
(EK #2136)

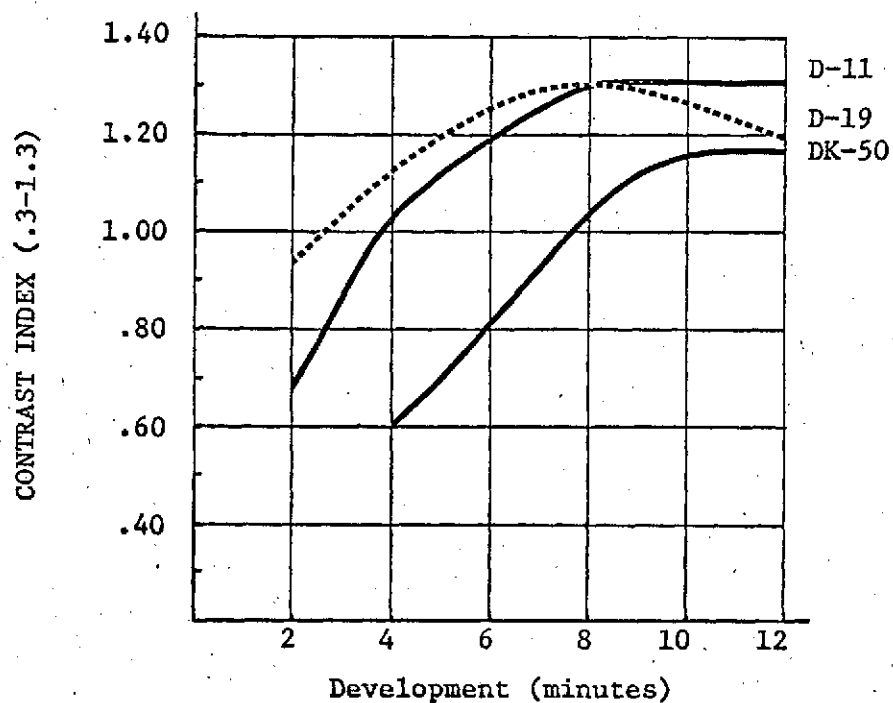


Figure 1

COMMERCIAL FILM  
(EK 4127)

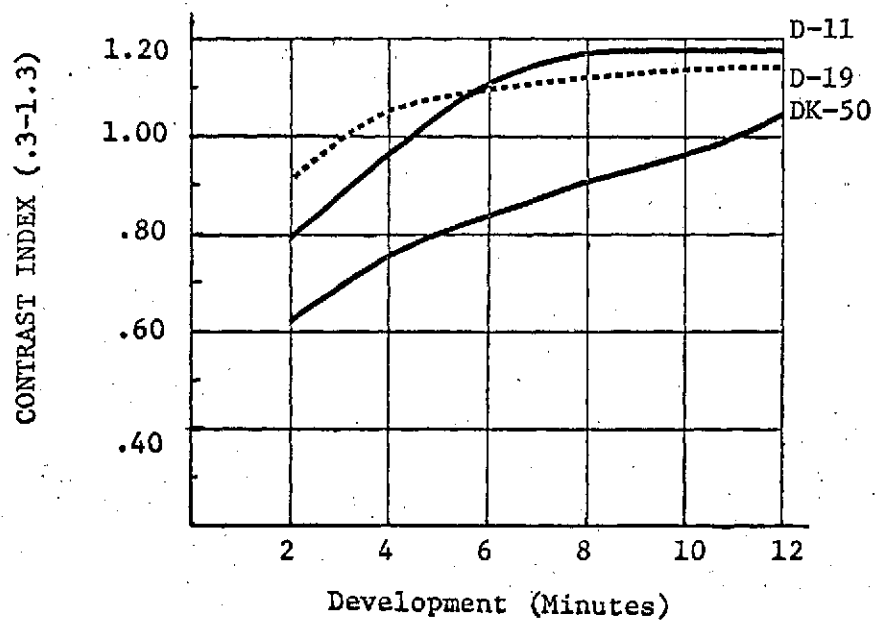


Figure 2

| <u>LEVEL I</u>             | <u>LEVEL II</u> (Inferred from characteristics)   | <u>CHARACTERISTICS</u>   |
|----------------------------|---|--|
| 1. Urban and Built-Up Land | 1. Residential light<br>a. light tone<br>b. dark tone<br><br>2. Residential medium and heavy<br>a. light tone<br>b. dark tone<br><br>4. Extractive<br><br>5. Transportation<br><br>6. Intensive development<br>a. light tone<br>b. dark tone<br><br>7. Strip development<br>a. light tone<br>b. dark tone | 1. Small buildings < vegetation (2 bldgs or less per 1/4 hectare)<br><br>2. Small buildings > vegetation (more than 2 bldgs per 1/4 hectare)<br><br>4. Raw extractive material sites with no vegetation<br><br>5. Linear 4-lane roadways, railways, and airfield runways<br><br>6. Large buildings or building complexes with parking lots and some vegetation<br><br>7. Intensive linear development along roadways |
| 2. Agricultural Land       | 1. Cropland, Cropland Pasture & Sod Farms<br>a. intensive management<br>b. normal management<br><br>2. Orchards, Vineyards & Horticultural Areas<br><br>4. Pasture and Brushland  | 1. Intensive homogeneous vegetation less than 6 ft. and/or soil in regular rectilinear formations<br><br>2. Intensive vegetation less than 20 ft in rowed block plantings and some soil possible<br><br>4. Vegetation less than 15 ft. in height and less than 50% canopy cover  |
| 4. Forest Land             | 1. Deciduous<br><br>2. Coniferous (Plantations & Natural)<br><br>3. Mixed Deciduous and Coniferous  | 1. Trees over 30 ft, 50%+ canopy cover and 90%+ deciduous<br>2. Trees over 15 ft, 50%+ canopy cover and 90%+ coniferous<br>3. Trees over 30 ft, 50%+ canopy cover  |

FOLDOUT FRAME

FOLDOUT FRAME

2

(CONTINUED)

| <u>LEVEL I</u> (Continued) | <u>LEVEL II</u> (Inferred from characteristics)  | <u>CHARACTERISTICS</u>  |
|----------------------------|--|---|
| 5. Water                   | 1. Streams and Waterways<br>2. Lakes and Ponds<br>3. Reservoirs<br>4. Bays and Estuaries | 1. Open fresh water - linear<br>2. Open fresh water - nonlinear<br>3. Open fresh water - dam or water control structure<br>4. Open salt water - coastal configuration |
| 6. Wetland                 | 1. Marsh, Bogs and Herbaceous Wetlands<br>2. Brush and Wooded Wetlands                   | 1. Water with herbaceous vegetation<br>2. Water with woody vegetation and trees   |
| 7. Barren Land             | 2. Sand Beaches<br>3. Sand Dunes<br>4. Bare, Exposed Natural Rock                        | 2. Sand with no vegetation on perimeter of water<br>3. Sand with no vegetation and not on perimeter of water<br>4. Natural rock with little vegetation                |
|                            |  |   |

FOLDOUT FRAME

1

FOLDOUT FRAME

2